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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,933	04/16/2004	James Boner	US030180	9013

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER	
JAWORSKI, FRANCIS J	
ART UNIT	**PAPER NUMBER**
3737	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/825,933	BONER ET AL.	
	Examiner	Art Unit	
	Jaworski Francis J.	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4-16-04 IDS*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4-16-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: Page 4 line 22 after " imaging " add -- of --, also Fig. 3 would indicate that the coupling 94 bearings have element legend 102 and therefore the page 9 line 15 – 27 description should refer to same and not elements '96'.

Additionally page 7 lines 16 – 18 suggests that the relative location of crank member 56 with respect to housing 46 may be used to set or adjust the sweep range of the transducer array assembly 30. This would only be true if the receiving portion 82 (shown in Fig. 3) of the connecting drive member 58 were hinged with respect to crank 56 since changing the location of 56 within 46 in turn changes the vertical distance between 56 and the pivot axis of shaft 100 thus changing the height of the cone swept by the connecting member 58. Since this in turn changes the fixed angle between 58 and the vertical axis of driveshaft 48 and this fixed angle and the angle between the axis of receptacle 82 and the plane of 56 must sum to 90 degrees as the two angles are complementary, connector 58 must be able to angle-adjust at 82 as well as telescope into 82 to correspond to the new swept cone geometry. (US patents to Kunii et al (US4282879), Glover (US4757722) and Theumer (US4399822) are teachings with respect to conversion between actuator rotation and an adjustable reciprocation angle.)

Since no new matter may be introduced into the specification, see 35 U.S.C. 132(a), the Examiner suggests that the applicant merely restate the passage in a more accurate manner to indicate that the drive system may be adapted soas to

adjust the swing angle of the transducer as the crankshaft 56 is moved vertically within housing 46, a suggestion which the artisan could readily implement.

Appropriate correction is required.

Claims 1 – 20 are objected to because of the following informalities: .

The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Additionally, whereas applicants have designated the position actuator as " 32 " in Fig. 1 and " 42 " in fig. 2, when dependent claim 3 refers to " 32 " whereas the parent refers to " 42 " a lack of clarity results.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation " the assembly" in lines 4-5. There is insufficient antecedent basis for this limitation in the claim, and it is therefore unclear how the 'assembly " differs from the 'scan head ' earlier claimed.

Dependent claims variously inherit the defects.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4, 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Adams (US4762002). Adams teaches a processing system 12, 14 and 16 to generate and detect ultrasound frequencies, and a scanhead and transducer assembly 40 coupled thereto, the scanhead including a planar annular array transducer 18

mechanically coupled to a positional actuator (motor 20 operated in a servoed position mode together with output shafts 36, 46 and beveled gear 48) where the beveled gear is driven to rotate about the axis of 46 to pivot array 18 about a second perpendicular axis 38 via pivot members 50, (and 40 if this element is grouped therewith as opposed to with the transducer 'assembly').The scanhead assembly further includes a position sensor 22 coupled to driven member 48 by 46, 36 in order to detect rotational position of the driven member.

Claims 15, 17 and 19 - 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Cerofolini (US6572548) which teaches that in a mechanical scanhead system such as embodiments Figs. 3-4 or 5-6 or 7-8 a driven member rotatable about the motor axis may in turn drive a linear or phased transducer array about a second axis, the rotation being controlled over a rotational interval to provide approximate constant rotation (col. 5 lines 40 – 53) and with acquisition over mutually spaced apart scanlines L1, L2,...Ln at even increments shown in Fig. 1A for each successive sweep for display as an ultrasound image (see also col. 12 line 57 – col. 13 line 14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 – 4, 6-7, 9-10, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams as applied to claims 2, 4 above, and further in view of Shimizu et al (US4579122).

In an alternative interpretation to the anticipatory reading above where the terms positional actuator ' were interpreted broadly to refer to a motor and its output drive members driven soas to effect a positional change on a driven member, Adams is here considered to fall short under an interpretation that a position actuator be more narrowly defined as being not merely a motor and mechanical output but being slaved to perform when actuated under a servo control. (Effectively the alternative arguments accept a a distinction between a motor and a servomotor). Then it would have been obvious in view of Shimizu et al to 'close the loop' and transmit positioning signals between position detector 50 and motor driver 80 (see Fig. 3) such that 20 and 30 analogous to Adams's motor and shaft and drive gear are driven under a servo control, for the reason that one may then compensate for non-linearity in the motion-converting portion

30 to obtain a constant sweep velocity for the scan beam. Both references otherwise teach display of the scan results.

Additionally Shimizu et al teaches that alternative to bevel gearing in Adams, it would have been obvious to provide a crank member 34 with inward portion at 36 angled towards the rotational axis defined by 32 and including a pivot having pivotable member 42 and pivotable about 44 , and having a coupling member 36, 38 such that the connecting member is rotatably treceived within the bearing of 34 and hingedly connected to 42, 44 at points 46, since these were known rotational to oscillatory transfer mechanism equivalents in the ultrasound scanning art. Adam otherwise teaches that cover 32 may be used to confine an internal volume containing acoustic couplant 34 which bathes the acoustic array 18 in order to couple the vibratory ultrasound pressure wave to the test subject..

Additionally Shimizu et al teaches that a magnetic position encoder is advantageously used e.g. for 22 of Adams since this provides easy governance of an angle increment counter, see col. 5 line 12 – col. 6 line 13 thereof.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adams as applied to claim 1 above, and further in view of Mochizuki et al (US5152294), since whereas the former does not teach use of a curved linear array, it would have been obvious in view of 30 of the latter to provide such for 18 of Adam since this increases the sector width during scanning and permits 3D imaging buildup. In the alternative, Mochizuki et al further teaches in its Fig. 8 the servomotor control by 102 receiving

positional signals from 44 and acting on the drive motor and mechanical linkages 26 to provide actuator function.

Claims 8, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams alone or further in view of Shimizu et al as applied to claim 7 above, or Adams-in-view-of-Shimizu et al as applied against claim 10 above, and further in view of Schroeder et al (US4572200), since whereas the former are silent as to specifics of the motor portion of the actuators, it would have been obvious in view of the latter to incorporate a permanent field producing magnet onto the rotating motor shaft and a stationary armature 35-46 since this design was known to provide a small drive with a high coercive force which would be desirable in overcoming inertia during scanning. Addtionally Schroeder et al teaches the obviousness of including a bladder or diaphragm 66 as discussed in col. 5 top portion thereof into an ultrasound mechanical scanner since this allows for thermal expansion of contents without leakage.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adams alone or further in view of Shimizu et al as applied to claim 7 above, and further in view of Mochizuki et al since whereas the former are each silent as to optical encoding e.g. for 22 of Adams, it would have been obvious in view of Mochizuki et al elements 46, 48 of the face figure and fig. 7 to use an optical encoder with many gratings since this permits fine resolution of the differential angle change during scanning..

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adams alone or further in view of Shimizu et al as applied to claim 7 above, and further in view of Sieben et al (US5438997) since whereas the former are silent as to encoder

resolution spacings, it would have been obvious in view of the latter to provide resolution up to 1000 counts per revolution since this was known to be a rate consistent with operational controls for spacing the several hundred scanlines per swept scan produced by such a system.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cerofolini as applied to claim 15 above, and further in view of Shimizu et al since the latter teaches non-constant rate scanning would advantageously compensate for non-linearities brough about in scan sweep increments dure to mechanical factors of the scan system.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cerofolini as applied to claim 15 above, and further in view of Schuette et al (US4106492) since whereas the former are silent as to constant rotational values over interval portions, it would have been obvious in view of the latter col. 5 lines 15 – 69 to provide a constant rotational value e.g. by programmed triangle wave servo control, and over sub-intervals of scan defined by sector width and asymmetries with respect to center axis of a scan in order to visualize partially hidden anatomic structures.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

01062005

Francis J. Jaworski
Primary Examiner